Trend Study 29-3-03

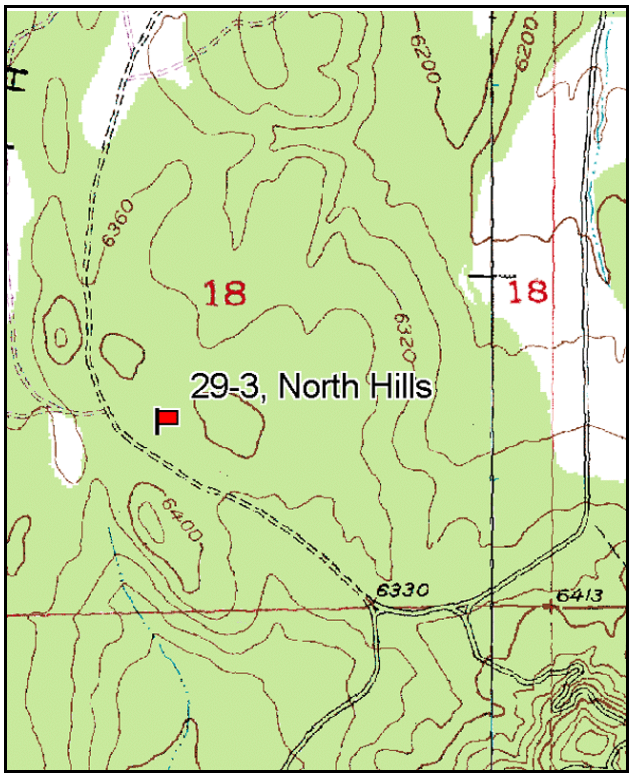
Study site name: North Hills . Vegetation type: Chained,Seeded P-J .

Compass bearing: frequency baseline 323 degrees magnetic.

Frequency belt placement: line 1 (11ft), line 2 (34ft), line 3 (59ft), line 4 (71ft), line 5 (95ft). Rebar: belt 4 on 1ft.

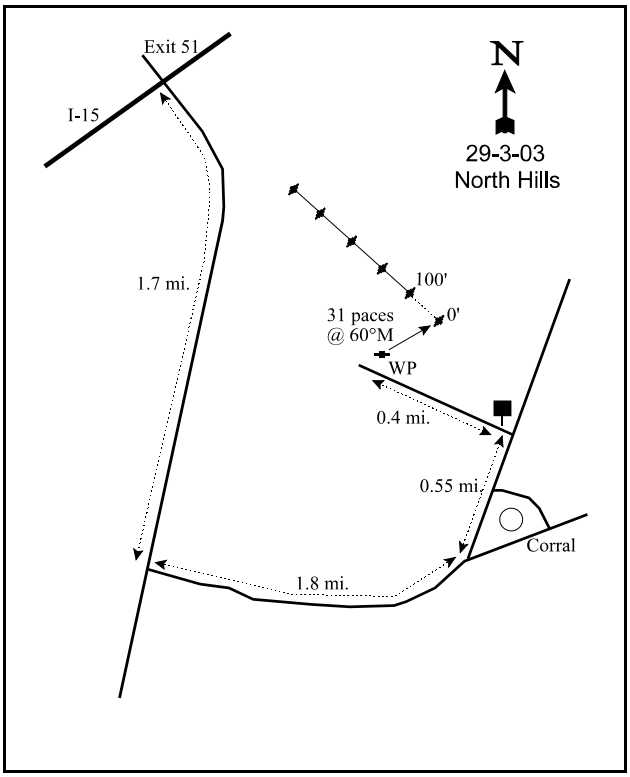
LOCATION DESCRIPTION

From Exit 52 (Hamilton Park), proceed south on the west side of the freeway for 1.7 miles. Turn left and go 1.8 miles to a corral. Stay left for 0.55 miles to a turnoff into the chaining with a sign that says "North Hills Reseeding." Continue 0.4 miles to a witness post on the right. Walk 31 paces at 60 degrees magnetic to the 0-foot stake.



Map Name: Kanarraville

Township 37S , Range 11W , Section 18



Diagrammatic Sketch

GPS: NAD 27, UTM 12S 4161124 N, 311510 E

DISCUSSION

North Hills - Trend Study No. 29-3

This trend study was established in 1998 on a chained and seeded pinyon-juniper site in the North Hills located north of Kanarraville. The area lies between I-15 and the Hurricane Cliffs to the east. The site was chained in 1967 and seeded to crested wheatgrass and intermediate wheatgrass which now dominate the site. The area contains rolling terrain with the study established on a wide ridge top. Slope is gentle (5%) with a south aspect and an elevation of about 6,400 feet. Pinyon pine and Utah juniper trees are found on the site in low densities. Point-quarter data estimated only 18 pinyon and 29 juniper trees/acre in 1998. Average basal diameter was 2 inches for pinyon and 1.3 inches for juniper. There is some evidence of hand cutting of young trees in the past. Deer use on the site is heavy, and there is also some sign of elk and cattle use. Pellet group data from 1998 estimated 103 deer days use/acre (254 ddu/ha). Most pellet groups appeared to be several months old, but a deer were seen near the site during study site establishment on July 16th of 1998. Estimated elk and cattle use was low at 6 elk and 4 cow days use/acre (15 edu/ha and 10 cdu/ha) in 1998. Cattle pats appeared to be from the previous fall (1997). Pellet group data from 2003 estimated 118 deer days use/acre (291 ddu/ha). A few old cattle pats were counted but no elk pellet groups were encountered.

Soil is somewhat shallow with a moderate amount of rock and pavement on the surface and within the profile. Effective rooting depth is estimated at only 10 inches. Soil texture is a sandy loam which is neutral in reaction (pH 6.8). Due to the rocky nature of the soil, average soil temperature is very high measured at about 78°F at a depth of 9 to 11 inches in both 1998 and 2003. Erosion is not a problem on the site due to the abundance of herbaceous vegetation and the gentle terrain.

The site supports a variety of browse species including Utah serviceberry, black sagebrush, mountain big sagebrush, and Gambel oak. Mountain big sagebrush is the most numerous species with a cover value of 13% in 1998 and 11% in 2003. Sagebrush provides about 70% of the total browse cover with a stable density estimated at 1,860 plants/acre in 1998 and 1,820 in 2003. Utilization was moderate to heavy during both readings. Vigor was poor on 13% of the population in 1998 and 9% in 2003. The number of decadent plants was moderately high in 1998 at 31% of the population, increasing to 48% in 2003. Young recruitment has been marginal during each reading. There is also a small number of moderately utilized black sagebrush which appear to be black/mountain big sagebrush hybrids.

Utah serviceberry provides about 14% of the total browse cover with a population estimated at 560 plants/acre in 2003. Mature plants are large averaging nearly 4 feet in height. They display light to moderate use, good vigor, and low decadence. There are also some isolated thick oak clones on the site. Mature plants average over 4 feet in height, making much of the oak partly unavailable to browsing. Available plants appear unutilized however. A few scattered heavily hedged bitterbrush provide some additional browse forage.

The herbaceous understory dominates the site with seeded perennial grasses, crested and intermediate wheatgrass, providing most of the herbaceous cover. Both of these species significantly declined in nested frequency in 2003, and also showed large declines in cover. A few other perennial grasses occur occasionally. Forbs are severely limited and produce less than 1% cover.

1998 APPARENT TREND ASSESSMENT

The soil appears stable with abundant and well dispersed herbaceous vegetation. The browse trend appears stable for now, but reproduction of the key species, mountain big sagebrush, is poor. Utilization of preferred browse species is mostly moderate. The herbaceous understory is abundant, although composition is poor and dominated by seeded grasses, crested and intermediate wheatgrass. Forbs are nearly absent. Trend will continue to be stable as long as the these exotic grasses remain in high numbers.

2003 TREND ASSESSMENT

Trend for soil is slightly down. Cover of bare ground has increased while vegetation and litter cover have declined. There is still good protective ground cover to prevent most erosion and the erosion condition class was determined to be stable in 2003. The key browse species, mountain big sagebrush, is showing the effects of several years of drought. Annual precipitation was only 49% of normal in 2002 at Cedar City. Spring precipitation (April to June) has been poor for the past 3 years (2001 - 2003), averaging only 59% of normal. The population of mountain big sagebrush has remained stable in density since 1998 but utilization is heavier and the number of decadent plants has increased to 48% of the population. No seedlings were encountered and young plants accounted for only 4% of the population. It appears that this population will start to decline in the future if young recruitment does not improve. Serviceberry is also important although it provides only 15% of the browse cover. It has remained stable in average cover and strip frequency. Use is slightly heavier but vigor remains good and no plants were classified as decadent. Trend for browse is considered slightly down due to increasing decadence and poor young recruitment of the sagebrush population. The herbaceous understory is also showing the effects of drought. Sum of nested frequency of perennial grasses has declined 26%, and cover has dropped from 24% in 1998 to 9% in 2003, a decrease of more than 60%. Seeded crested and intermediate wheatgrass provide nearly all of the grass cover. Both species declined significantly in nested frequency. Forbs are still rare. Trend for the herbaceous understory is considered slightly down.

TREND ASSESSMENT
soil - slightly down (2)
browse - slightly down (2)
herbaceous understory - slightly down (2)

HERBACEOUS TRENDS --
Management unit 29 , Study no: 3

Type	Species	Nested Frequency '98	Nested Frequency '03	Average Cover % '98	Average Cover % '03
G	Agropyron cristatum	271	233	19.65	7.71
G	Agropyron intermedium	142	86	3.04	1.12
G	Aristida purpurea	-	4	-	.15
G	Bromus tectorum (a)	24	17	.23	.05
G	Hilaria jamesii	6	6	.41	.18
G	Oryzopsis hymenoides	3	-	.00	-
G	Poa secunda	10	-	.33	-
G	Sitanion hystrix	21	6	.46	.06
G	Vulpia octoflora (a)	3	-	.00	-
Total for Annual Grasses		27	17	0.23	0.05
Total for Perennial Grasses		453	335	23.91	9.22
Total for Grasses		480	352	24.15	9.27
F	Arabis spp.	1	-	.00	-
F	Astragalus spp.	12	9	.30	.36
F	Chaenactis douglasii	-	1	-	.03

Type	Species	Nested Frequency		Average Cover %	
		'98	'03	'98	'03
F	Draba spp. (a)	-	2	-	.03
F	Gilia spp. (a)	-	3	-	.00
F	Lithospermum spp.	10	9	.03	.07
F	Microsteris gracilis (a)	-	4	-	.01
F	Navarretia intertexta (a)	1	-	.00	-
F	Oenothera spp.	-	3	-	.03
F	Ranunculus testiculatus (a)	-	4	-	.01
F	Sphaeralcea grossulariaefolia	-	2	-	.00
Total for Annual Forbs		1	13	0.00	0.06
Total for Perennial Forbs		23	24	0.34	0.50
Total for Forbs		24	37	0.34	0.56

Values with different subscript letters are significantly different at alpha = 0.10

BROWSE TRENDS --
Management unit 29 , Study no: 3

Type	Species	Strip Frequency		Average Cover %	
		'98	'03	'98	'03
B	Amelanchier utahensis	15	16	2.34	2.57
B	Artemisia nova	5	1	.30	.00
B	Artemisia tridentata vaseyana	59	55	13.00	11.44
B	Chrysothamnus viscidiflorus	0	1	.00	-
B	Gutierrezia sarothrae	0	1	-	-
B	Juniperus osteosperma	0	1	-	-
B	Opuntia spp.	2	0	-	-
B	Purshia tridentata	1	1	-	-
B	Quercus gambelii	6	10	2.19	2.79
Total for Browse		88	86	17.84	16.81

CANOPY COVER, LINE INTERCEPT --
Management unit 29 , Study no: 3

Species	Percent Cover '03
Amelanchier utahensis	3.95
Artemisia nova	.15
Artemisia tridentata vaseyana	8.23
Quercus gambelii	4.36

KEY BROWSE ANNUAL LEADER GROWTH --
Management unit 29 , Study no: 3

Species	Average leader growth (in) '03
Artemisia tridentata vaseyana	2.9
Purshia tridentata	4.0

POINT-QUARTER TREE DATA --
Management unit 29 , Study no: 3

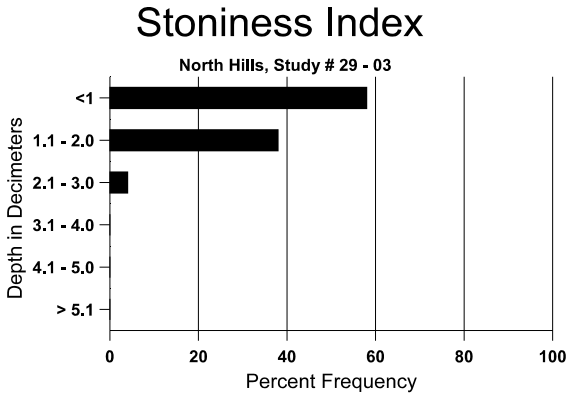
Species	Trees per Acre		Average diameter (in)	
	'98	'03	'98	'03
Juniperus osteosperma	29	38	1.3	1.2
Pinus edulis	18	N/A	2.0	N/A

BASIC COVER --
Management unit 29 , Study no: 3

Cover Type	Average Cover %	
	'98	'03
Vegetation	39.57	24.71
Rock	6.71	5.57
Pavement	12.20	17.24
Litter	51.77	36.99
Cryptogams	.41	.03
Bare Ground	21.43	34.08

SOIL ANALYSIS DATA --
Management unit 29, Study no: 3, Study Name: North Hills

Effective rooting depth (in)	Temp °F (depth)	pH	%sand	%silt	%clay	%0M	PPM P	PPM K	ds/m
9.9	78.7 (8.5)	6.8	70.0	14.2	15.8	3.1	9.4	16.0	0.5



PELLET GROUP DATA --
Management unit 29 , Study no: 3

Type	Quadrat Frequency '98	Quadrat Frequency '03	Days use per acre (ha) '98	Days use per acre (ha) '03
Rabbit	28	32	-	-
Elk	5	-	6 (15)	1 (2)
Deer	58	34	103 (254)	118 (291)
Cattle	1	2	4 (10)	5 (13)

BROWSE CHARACTERISTICS --
Management unit 29 , Study no: 3

		Age class distribution (plants per acre)					Utilization				
Year	Plants per Acre (excluding seedlings)	Seedling	Young	Mature	Decadent	Dead	% moderate	% heavy	% decadent	% poor vigor	Average Height Crown (in)
Amelanchier utahensis											
98	**1040**	-	380	620	40	-	21	2	4	0	38/56
03	**560**	-	280	280	-	20	29	14	0	0	42/51
Artemisia nova											
98	**120**	-	-	100	20	20	83	0	17	0	13/24
03	**20**	-	-	20	-	-	0	0	0	0	13/28
Artemisia tridentata vaseyana											
98	**1860**	120	100	1180	580	500	56	14	31	13	26/37
03	**1820**	-	80	860	880	400	48	37	48	9	25/33
Chrysothamnus nauseosus hololeucus											
98	**0**	-	-	-	-	-	0	0	-	0	-/-
03	**0**	-	-	-	-	-	0	0	-	0	42/26
Chrysothamnus viscidiflorus											
98	**0**	20	-	-	-	-	0	0	-	0	-/-

		Age class distribution (plants per acre)					Utilization				
Year	Plants per Acre (excluding seedlings)	Seedling	Young	Mature	Decadent	Dead	% moderate	% heavy	% decadent	% poor vigor	Average Height Crown (in)
03	**20**	-	20	-	-	-	0	0	-	0	-/-
Gutierrezia sarothrae											
98	**0**	-	-	-	-	-	0	0	-	0	12/9
03	**20**	-	-	20	-	-	0	0	-	0	8/11
Juniperus osteosperma											
98	**0**	-	-	-	-	20	0	0	-	0	-/-
03	**20**	-	20	-	-	-	0	0	-	0	-/-
Opuntia spp.											
98	**40**	-	-	20	20	-	0	0	50	50	5/6
03	**0**	-	-	-	-	-	0	0	0	0	5/13
Purshia tridentata											
98	**20**	-	-	20	-	-	100	0	-	0	39/72
03	**20**	-	-	20	-	-	0	100	-	0	37/52
Quercus gambelii											
98	**940**	60	340	600	-	-	0	0	-	0	50/28
03	**1420**	-	220	1200	-	140	0	0	-	0	49/32